

## **DETACHABLE TOILET SEAT MOUNTING STRUCUTRE**

### **BACKGROUND OF THE INVENTION**

#### **1. Field of the invention**

The present invention relates to the mounting arrangement of a toilet  
5 seat for toilet and, more specifically, to a detachable toilet seat mounting  
structure.

#### **2. Description of the Related Art**

A ballfloat toilet is generally comprised of a toilet bowl, a toilet seat  
fastened pivotally with the toilet bowl, a toilet seat lid pivoted to the toilet bowl  
10 and adapted to cover the toilet seat, and a water tank at the back side of the  
toilet bowl. There are ballfloat toilets equipped with spring means or a motor  
drive that automatically lifts the toilet seat after leaving of the user using the  
toilet. However, because the toilet seat is not detachable, it is difficult to clean  
the connection area between the toilet seat and the toilet bowl thoroughly, and  
15 the connection area between the toilet seat and the toilet bowl may be covered  
with dirt that may contaminate the user.

FIG. 1 shows a toilet seat mounting structure according to the prior art.  
As illustrated, the toilet bowl has a mounting plate **80** at the rear side and a  
plurality of knuckles **82** at the mounting plate **80**; the toilet seat **90** has a  
20 plurality of knuckles **92** aligned at the rear side and pivotally connected  
between the knuckles **82** at the mounting plate **80** by a pivot bolt **70**. According  
to this design, it is difficult to remove the toilet seat **90** from the mounting plate  
**80** for cleaning.

Therefore, it is desirable to provide a detachable toilet seat mounting structure, which enables the user to easily detach the toilet seat from the toilet bowl without any tools.

## **SUMMARY OF THE INVENTION**

5           The present invention has been accomplished under the circumstances in view. It is one object of the present invention to provide a toilet seat mounting structure, which enables the toilet seat to be conveniently and detachably fastened to the toilet bowl. It is another object of the present invention to provide a toilet seat mounting structure, which enables the toilet  
10 seat and the toilet bowl to be conveniently and well washed, preventing contamination.

To achieve these and other objects of the present invention, the detachable toilet seat mounting structure comprises a pivot shaft horizontally provided at a mounting plate at the top of a toilet bowl, the pivot shaft having  
15 two reduced portions, and two knuckles provided at the rear side of a toilet seat for coupling to the pivot shaft to detachably pivotally secure the toilet seat to the mounting plate at the toilet bowl. According to an alternate form of the present invention, the pivot shaft is provided at the toilet seat, and the knuckles are provided at the toilet bowl for receiving the pivot shaft.

## **20 BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is an exploded view of a toilet seat mounting structure according to the prior art.

FIG. 2 is an exploded view of a toilet seat mounting structure

according to the present invention.

FIG. 2A is a sectional assembly view in an enlarged scale of the toilet seat mounting structure shown in FIG. 2.

FIG. 3 is an exploded view of an alternate form of the toilet seat mounting structure according to the present invention.

FIG. 4 is an exploded view of another alternate form of the toilet seat mounting structure according to the present invention.

FIG. 5 is an exploded view of still another alternate form of the toilet seat mounting structure according to the present invention.

FIG. 6A is a sectional view of a part of still another alternate form of the toilet seat mounting structure according to the present invention.

FIG. 6B is a sectional view of a part of still another alternate form of the toilet seat mounting structure according to the present invention.

FIG. 6C is a sectional view of a part of still another alternate form of the toilet seat mounting structure according to the present invention.

FIG. 7 is an elevational view of a toilet showing soft pad provided at the toilet seat according to the present invention.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to FIGS. 2 and 2A, the toilet seat, referenced by **10**, has a pivot shaft **30** fixedly provided at the rear side detachably coupled to two knuckles **40** at a mounting plate **20**, which is fixedly disposed at the top of the toilet bowl near the rear side. The pivot shaft **30** has two reduced portions **34** of oblong cross section **344** corresponding to the knuckles **40**. The oblong cross

section 344 of each reduced portion 34 has two smoothly arched and outwardly curved opposite short sides 342. The knuckles 40 each have an axially extended circular through hole 42, a gate 44 obliquely upwardly extended from the circular through hole 42 in radial direction, and chamfered edges 442

5 symmetrically disposed at two sides of the gate 44. The width of the gate 44 (i.e., the length between the two opposite long sides of the gate 44) is approximately equal to the thickness of the oblong cross section 344 of each reduced portion 34 of the pivot shaft 30. By means of aiming the smoothly arched and outwardly curved opposite short sides 342 of the reduced portions

10 34 at the gates 44 of the knuckles 30, the reduced portions 34 of the pivot shaft 30 can easily be inserted into the circular through hole 42. After insertion of the reduced portions 34 of the pivot shaft 30 can easily be inserted into the circular through hole 42, the toilet seat 10 is turned downwards and closely attached to the top of the toilet bowl, keeping the pivot shaft 30 secured to the knuckles 40.

15 When wishing to detach the toilet seat 10 from the mounting plate 20 (the toilet bowl), lift the toilet seat 10 to a particular angle where the smoothly arched and outwardly curved opposite short sides 342 of the reduced portions 34 of the pivot shaft 30 are respectively aimed at the gates 44 of the knuckles 30, and then pull the toilet seat 10 outwards to move the pivot shaft 30 through the

20 gates 44 of the knuckles 30 to the outside of the knuckles 40.

FIG. 3 shows an alternate form of the present invention. According to this embodiment, the positions knuckles 40 and the pivot shaft 30 are relatively changed, i.e., the pivot shaft 30 is provided at the mounting plate 20 and the

knuckles **40** are made at the toilet seat **10** for coupling to the pivot shaft **30** at the mounting plate **20**.

FIG. 4 shows another alternate form of the present invention. According to this embodiment, the mounting plate **20** comprises two knuckles **40** shaped like a stub barrel and axially aligned in a line, and two stop members **22** respectively disposed adjacent to the knuckles **40**; the toilet seat **10** has two angled coupling rods **12** corresponding to the knuckles **40** at the mounting plate **20**. During installation, the toilet seat **10** is held in vertical (perpendicular to the mounting plate **20** at the toilet bowl), and then toilet seat **10** is moved sideways to insert the angled coupling rods **12** into the knuckles **40**. After insertion of the angled coupling rods **12** into the knuckles **40**, the toilet seat **10** is lowered and closely attached to the top of the toilet bowl, keeping the angled coupling rods **12** respectively stopped against the stop members **22**.

FIG. 5 shows still another alternate form of the present invention. According to this embodiment, the mounting plate **20** (at the toilet bowl) comprises two pivot shafts **30** horizontally disposed at different elevations, and two symmetrical pairs of knuckles **40** are respectively provided at the toilet seat **10** and the toilet set lid **50** for detachably coupling to the pivot shafts **30**.

FIG. 6A is a sectional view of a part of still another alternate form of the present invention. According to this embodiment, each recessed portion **34** of the pivot shaft **30** has a cross section shaped like the first quarter of the moon.

FIG. 6B is a sectional view of a part of still another alternate form of

the present invention. According to this embodiment, each recessed portion 34 of the pivot shaft 30 has a cross section shaped like the third quarter of the moon.

FIG. 6C a sectional view of a part of still another alternate form of the present invention. According to this embodiment, each recessed portion 34 of the pivot shaft 30 has a circular cross section; the gate 44 is a smoothly arched passage, having a width approximately equal to the diameter of the circular cross section of each recessed portion 34 of the pivot shaft 30.

Referring to FIG. 7, the toilet seat 10 may be covered with a soft pad 14 molded from thermal plastic rubber (TPR) or foamed material that gives a warm touch, comforting the user's hips.

A prototype of detachable toilet seat mounting structure has been constructed with the features of FIGS. 2~7. The detachable toilet seat mounting structure functions smoothly to provide all of the features discussed earlier.

Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.